Title: **3D Representations of Complex Data Structures**
Level: BSc
Study program: BPROG
Supervisor: Christopher Frantz
Department: IDI Gjovik
Project relevant: Excited

Description

Understanding existing software in the context of software engineering is often challenging, especially when employing complex data structures as found in graphics or data-centric applications. Similarly, when subject to the choice of libraries, implementation problems only become apparent once using the library (i.e. after adopting it).
Visual cues can facilitate the faster comprehension of programs, both for novices, but also for advanced programmers, when dealing with complex data representations. This proposal suggests the following:
Allowing the retrieval of existing project repositories, providing an accessible visualisation in 3D, and use this as a tool to understand the visualised program, as well as serving as a diagnostic tool to suggest potential refinements. Optionally or alternatively, the visualisation can be used in VR.

Technical details

- Public-facing Web service that consumes link to repository
- Deployed using container technology (e.g., Docker)
- System retrieves source code from repository
- The system should work with programming languages such as C++ and Java; specific or alternative languages are subject to negotiation
- Where relevant, the system should be able to build the submitted repository
- The system should provide a 3D visualisation of selected data structures (e.g., using OpenGL)
- The developed project should be developed with professionalism in mind (tests, best practices)
- The user of the system should be able to interact with the data (e.g. choosing, collapsing branches of structures, etc.)
- Software quality metrics should be presented to the user
- Alternative direction (depending on student interest): Exploration of data structure in VR, with all other requirements unchanged

Applied project

The product is expected to be used a) to assess the quality of developed software, and b) to explore existing software for quick adoption or evaluation with respect to quality.